Cruise Passengers' Perceived Service Quality During the Pandemic Period via User-Generated Content

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Abstract

The coronavirus epidemic, which emerged in Wuhan at the end of 2019, spread worldwide and caused more than 4 million deaths as of 2021. The cruise industry, whose goal is to maintain customer satisfaction at the highest possible level, like all service industries, has passed a difficult test with serious coronavirus disease-2019 (COVID-19) cases that emerged on various ships. The new rules of the COVID-19 pandemic are reflected in the service processes of the ships that started to sail again after a long-term pause in the sector. The main motivation of this study is to determine whether the factors affecting customers' perceived service quality have changed during the pandemic period in the cruise industry, which is one of the sectors where service quality should be maintained high. Therefore, this study aims to determine the factors affecting the perceived service quality of cruise passengers and determine the new factors that occurred during the pandemic. To achieve this goal, the online narratives of 418 passengers cruising in the European Region between September 2020 and September 2021 were analyzed using Leximancer software, and key elements of passengers' perceptions of service quality were determined. As a result of the study, it was found that cabin location, restaurant quality, and COVID-related variables became significant factors affecting the perceived service quality of cruise passengers during the pandemic period. Additionally, disembarkation and embarkation, which were important variables in the pre-COVID period, were reclassified under the COVID category. The study also determined that adherence to COVID-19 measures by cruise companies positively impacted customer satisfaction during this period.

Keywords: Leximancer, Service quality perception, User generated content

1. Introduction

Historically, the early 20th century was a preferred time for cruise travel due to maritime transportation being a strong alternative for passenger transport. Cruise ships, which were widely used by people with high incomes in the 1920s, lost their popularity due to developments in air transportation after the second world war. By the end of the 20th century, cruise lines, which focused on marketing activities by expanding into different market segments and with the help of technological opportunities, have regained their former popularity today and have increased their market shares significantly with features that can appeal to almost every demographic group [1,2].

Because of these efforts, the global cruise industry revenue has exceeded US$ 27 million in recent years; however, the travel restrictions imposed by the coronavirus disease-2019 (COVID-19) pandemic have adversely affected the industry in 2020, and the value of the cruise industry has decreased to US$ 3.37 million in 2021. According to 2021 data, while the cruise industry experienced a decrease of 87.8% in its total revenue and a loss of approximately 2,500 jobs worldwide, only 5.8 million passengers preferred cruise travel [3]. To mitigate these negative impacts, ensuring the health and safety of passengers, crew, and communities became the top priority for all stakeholders in the cruise industry, including cruise companies, travel agencies, ports, destinations,

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and suppliers. In this context, Cruise Lines International Association and its member organizations have invested in R&D studies, worked with global experts, and collaborated closely with authorities in the health, transportation, and safety fields to develop health and safety protocols. The safe resurgence of the industry in Europe, the United Kingdom, some parts of Asia, and North America, on the other hand, gives strong signals that cruising is imminent when the right precautions are taken [4].

According to [5], customer perception is their opinion of the service they received, and service quality is a generic evaluation tool like attitude. Literature described the perception of service quality as a judgment or attitude about how much better the service is [6]. In the cruise industry, in addition to concerns such as health and safety arising from the COVID-19 pandemic, many elements affect the cruise experience and service quality perceptions of tourists, such as food and beverage services, events, customer service, tours, itineraries, shopping [2,7,8], entertainment, embarkation, disembarkation, excursions [9], Wi-Fi, and mobile phone connections. It is argued that these factors affect perceived service quality, cruise experience, and overall customer satisfaction.

Therefore, the purpose of this study is to give an answer to questions as; "how COVID-19 pandemic restrictions changed passengers' perceived services?", "which cruise service quality attributes have altered in pandemic conditions?" and "how passengers responded to changes?"

2. Literature Review

COVID-19 virus emerged in China in 2019, affected the entire world in a very short time period, and was declared a pandemic by the World Health Organization in 2020 [10]. In this study, which aims to examine the effects of COVID-19 on the perceived service quality variables in the cruise sector, it has been determined that the literature examining the COVID-19 process in the cruise industry is quite limited.

Because of the query made on the Web of Science database on 08.02.2022, using the key words and phrases Cruise Industry + COVID and Cruising + COVID, it was determined that there were 43 studies in total. Of these studies, 37 were published as articles, 2 as proceeding paper and editorial material, and one as review and one as letter. All published studies, because of the timeline of the existence of the COVID-19 virus, were published between 2020 and 2021. Web of science categories of the studies are examined, and it is seen that the studies mainly focus on hospitality leisure sport tourism (11 study) and environmental studies (9 study). These categories are followed by management (7 study), public environmental occupational health (6 study), environmental sciences (6 study) and green sustainable

science technology (5 study) respectively. While only four studies were found in the business category, no study was found in the marketing category. Likewise, when the research areas of these studies are examined, environmental sciences ecology (11 study), social sciences (11 study), and business economics (10 study) stand out as the main research areas. When WOS categories were examined in the existing literature, no study was found in the marketing category. Given that the cruise service sector can be classified as a luxury segment, where the emphasis on service quality is particularly intense and generally appeals to an upper-class customer base, it should be examined from a marketing science perspective. Therefore, this study aims to fill this gap in the literature.

2.1. Service Quality Dimensions in the Cruise Industry

The concept of product and service quality entered the marketing literature the 1980s and was divided into two categories: physical product and service marketing. In physical product marketing, quality has been defined and measured with increasing levels of precision, but when it comes to services marketing, difficulties have arisen in defining, measuring, and controlling quality. Since services are performances rather than objects, it is nearly impossible for uniform quality to be established and enforced [11]. However, the obvious benefits that service quality will provide to organizations include customer satisfaction and increased profitability [12], have caused researchers and managers to attach great importance to this issue in the last four decades. In 2003, [13] defined the concept as "service quality is a focused evaluation that reflects the customer's perception of specific dimensions of service namely reliability, responsiveness, assurance, empathy, tangibles". In 1984, [14] argued that businesses should understand how consumers' perceptions of quality and service quality are affected in order to gain competitiveness, and with the "technical and functional quality model" they developed, they decided that the three components of service quality are "image, technical quality and functional quality". In [5], a service quality model was created based on the gap analysis between customer expectations and business performance. The GAP model argues that service quality is a function of the gaps between expectation and performance across quality dimensions. Since the 1980s, with the emergence of the service quality concept, many scholars, academics, and researchers have examined the concept of service quality and developed many models that aim to measure or increase service quality. Some of these models are given below;

• IT-based model [15],

• Synthesized model of service quality [16],

• Model of e-service quality [17].

• Model of perceived service quality and satisfaction [18],

• Evaluated performance and a normed quality model [19],

• Attribute and overall affect model [20],

• IT alignment model [21],

• Internet banking model [22],

• Internal service quality model [23],

• Retail service quality and the perceived value model [24],

• The ideal value model of service quality [25],

• Antecedents and mediator model [26],

• PCP attribute model [27],

• Internal service quality DEA model [28],

• Service quality, customer value, and customer satisfaction model [29],

• Attribute service quality model [30],

• Performance only model [31].

When all these models related to service quality are examined, it is concluded that the service quality literature is generally shaped in line with customer expectation, satisfaction, and perception. In addition to the aforementioned inference, when the nature of the service sector is considered, which changes according to the characteristics of the service provided, the necessity of examining the concept of service quality in the triangle of the specific characteristics of the sector in which the service is provided, the competencies of the service provider, and the service perception of the potential customers expected to buy the service comes to the fore. The SERVQUAL model proposed by [6] to measure perceived service quality has been adapted by many researchers to measure service quality in different sectors such as accommodation and tourism, restaurants, destinations, and outbound guide package tours. Among the adaptations of the SERVQUAL model, the model created for historical houses was named HISTOQUAL, the model created for ecotourism service quality was named ECOSERV, the model created for the measurement of vacation experience satisfaction was named HOLSAT, and the model created for cruise experience satisfaction was named SERV-PERVAL [32].

The SERV-PERVAL scale was used in 2014 to examine the relationship between the "cognitive perceived value, affective perceived value, satisfaction with the cruise experience and the basic structures of behavioral intentions" because of the cruise travel experience of Asian cruise passengers [33]. In the study, five main components designed to measure cognitive perceived value which are, "emotional response as emotional perceived value, level of satisfaction, behavioral intention and demographic variables". The cognitive value perceived by cruise passengers was obtained through explanatory factor analysis in four dimensions: "cruise ship facilities, food and beverage service, entertainment, and service provided by the crew" [33]. The SERV-PERVAL model was also used by [34] in a study that aimed to test the relationships between cruise passengers' "emotional response, reputation, behavioral price, perceived value, monetary price, quality and repurchase intentions". That study used a measurement tool consisting of 25 items under five main factors: "quality, monetary price, behavioral price, emotional response, and reputation". The study revealed that "reputation, emotional response and monetary price" were the antecedents of quality perceptions of both first-time visitors and repeaters.

Reference [8] aimed to determine the satisfaction levels of Hong Kong cruise passengers and the factors affecting their satisfaction. They used 31 attributes in five main categories as variables, named "accommodation, food and beverage, entertainment, other facilities, and the staff". The study's findings led to the following conclusion: The key factors influencing the rejoining of the cruise were "accommodation, food and beverage and entertainment", respectively. A conceptual framework has been created that measures the experiential performance of cruise voyages in a study, which aims to examine the information on tourist behavior in navigational environments by analyzing the effects of the physical environment on a cruise experience. In the proposed model, there are eight sub-variables under the main variables: perceived servicescape, cruise experience, intention to recommend, and intention to return [35]. Authors suggested;

Ambient factors (sounds, cleanliness, lighting, music, temperature);

1. Design and functionality factors (decor, colors, layout, size, entertainment, architecture, seating comfort)

2. Social factors (crowding, queues, cruiser cues, crew friendship)

3. As subvariables of the main variable perceived servicescape [35].

In 2006 [36] examined the "moment of truth" of cruise passengers using the critical incident technique in their study, in which they examined the "overall satisfaction, perceived value, word-of-mouth communication and repurchase intentions" of cruise passengers via a survey method. Emphasizing that the truth of moments is an effective management tool for the cruise industry, the study grouped negative "service, staff/crew, food/beverage, entertainment, ship facilities, port of calls, children/teen issues, policies, and price" and positive "service, staff/crew, food/beverage, entertainment, ship facilities, port of calls and cabin" incidents and concluded that negative incidents

were much more effective than positive incidents on cruise passengers' post hoc cruise evaluations.

On the other hand, [37] analyzed the perceived importance and performance of service attributes offered to cruise passengers and attributes related to the US cruise industry using the importance-performance analysis method. In the study in which the data were collected by the survey method, the results were classified into three main groups; attributes of high importance "overall cleanliness, employee appearance, courteous and polite employees, make passengers feel safe, always willing to help passengers, responsive to passengers' needs, perform passengers' requests without error, dependable service, understanding passengers' specific needs, pay individualized attention to passengers", attributes of average importance "lighting, music, cruise motion, entertainment, recreation and sports facilities, fitness and health facilities, supplementary facilities, facilities for children" and attributes of low importance "interior and exterior décor, ship layout, and size of ship".

In 2020, a study approached this subject from a different perspective, analyzing cruise passengers' comments on online platforms in a study that aimed to determine cruise passengers' experiential perceptions of service quality regarding higher or lower money scores. In the study, they concluded that the perceived quality of cruise travel was determined by 10 basic elements: "ship, staff, food, entertainment, room, area, embarkation, excursion, disembarkation, and port" [9].

2.2. User-generated Content

In the past, when technology and social platforms were not as developed as today, interview and focus group methods were the main methods preferred by companies to determine customer needs in matters such as determining marketing strategies and product development. However. nowadays, when the industrial revolution is taking place, user-generated content (UGC) produced by users themselves, in line with their own wishes, instantly or whenever they feel appropriate/ready, is accepted as an alternative and reliable source to determine customer needs [38]. As of the early 2000s, smart web services based on new technology have enabled users to produce digital media and communicate with other users [39]. Conducted a systematic review of the research on UGCs and found that this phenomenon was included in the literature with references such as UGC, social media, participatory web, and Web 2.0. According to [39], UGC in the literature should have three basic features; must contain a personal contribution, be published, and be produced outside the professional field/professional routine.

UGC is characterized by personal contributions. This contribution can be summarized as commenting, researching, and preparing information within the framework of existing services or uploading individual texts, images, sounds, and visuals. For these contents and contributions produced by users to be classified as UGC, they must be open to the public or at least a group. Therefore, content contained in applications that only allow bilateral communication, such as e-mail or instant messaging applications, is not characterized as UGC. Finally, these UGC must be produced outside professional routines. In content produced within the scope of the UGC, design authority is generally in the hands of amateurs, as in citizen journalism [39].

The use of these contents (restaurant ratings, videos, tweets, road traffic situations), produced voluntarily by ordinary users, has become widespread in recent years. The reasons for this are that the content is cheap to obtain, the process is rewarding for content providers (appreciation, recognition, etc.), and the content produced is considered to be more reliable data because it consists of the experiences of real people, not modified by ordinary media organizations [40].

3. Methodological Approach

In keeping with the current trend, customers are increasingly posting reviews of the goods and services they have used online [41-43]. From the viewpoint of tourism, these internet forums where previous visitors' opinions are expressed are developing into an effective tool to direct other travelers' decisions [44]. The analysis of UGC, as recent studies have shown, also provides a chance to present passengers' current service perceptions.

Content analysis is a method for establishing reliable and valid assumptions about the content in which texts are used [45]. In the past decade, the content analysis method has become a useful tool with the rapid development of the internet [9]. However, manually coding the large amount of text data that the Internet provides has become time consuming [46]. To avoid time allocation, Leximancer online software was used in this study. Leximancer analyzes the meanings of chunks of text by extracting the major concepts and ideas using sophisticated algorithms that perform mathematical and scientific calculations using the Bayesian method of prediction [47,48].

Leximancer is a software tool designed for quantitative content analysis that utilizes a machine learning approach to discern key concepts within a text and their interrelations. This tool performs both thematic and semantic analyses of the textual data. The software generates data on the frequency and co-occurrence of concepts within textual data [49], operating a process that autonomously transforms

co-occurrence data from natural language into semantic patterns. This process is executed in two distinct phases: semantic and relational, each using a unique algorithm. These algorithms are fundamentally statistical and incorporate elements of nonlinear dynamics and machine learning techniques [50]. Upon identifying a concept via the machine learning mechanism, Leximancer develops a corresponding thesaurus, compiling words linked to the identified concept, thereby providing its semantic or definitional essence [51]. The resulting concept map provides a conceptual synopsis of the initial textual source.

In other words, the software first identifies concepts, which are groups of words that appear together in the text, and then ranks them according to their frequency of occurrence and relative incidence compared to identified concepts. Then, the software resolves concept co-occurrences in the text as well as direct relationships between concepts, which means that the concepts located in the central area of the concept map most frequently cooccur with other defined concepts in the text. Lastly, the software creates themes by clustering the concepts by their similarities and creates a concept map [52-55].

Leximancer software, which integrates content analysis methodologies with sophisticated analytical techniques for textual data, has gained widespread adoption across various research domains. Researchers use this tool in particular to extract important features of customer perceptions and experiences, which yields invaluable insights for various studies. Mahr et al. [52] systematically reviewed the concepts and theories underlying customer service experience (CSE) and its five dimensions using a text mining approach with Leximancer software. They emphasized the contribution of the sensorial dimension to CSE research. [9] used Leximancer software to analyze 2000 guest reviews from Cruisecritic.com, identifying ten major themes related to cruise service quality. Brochado et al. [53] used Leximancer software to analyze in-depth interviews and explore locals' perceptions in two highly tourism-dependent southern European cities. This study examined the impacts of the COVID-19 pandemic on local communities affected by city tourism and highlighted the variables that residents perceived as having the most influence on city tourism. Huang and Wang [54] used Leximancer to conduct a thematic content analysis of COVID-19-related empirical research in tourism and hospitality journals. This study identified research themes/ subthemes, research methods, and countries/regions of research.

This research aims to explore whether the COVID-19 pandemic induced changes in the service dimensions perceived by cruise passengers. To this end, it draws upon reviews from passengers on the first European routes to reopen after the pandemic. Given the voluminous and unstructured nature of these textual data, the use of text mining techniques was deemed appropriate by the authors. The choice of Leximancer as the analytical tool is attributed to its proven effectiveness in extracting themes and identifying common topics from text, its previous applications in similar academic fields, its robust user interface, and ease of use.

Following a description of the data source and data gathering technique, descriptive statistics are presented. The dataset was then examined using Leximancer software, and the results were presented. The study was summarized in the conclusion after the findings were examined along with the literature in the discussion part.

4. Data Collection and Preprocessing

Cruisecritic.com is a prominent website where users can share their past cruise experiences. From this perspective, it stands out as one of the most vital platforms for user-generated content in the cruise industry. Potential cruisers can utilize the user-generated content on the website to make informed decisions about their upcoming trips.

Reviews on cruisecritic.com may include the name of the ship, the route, the travel date, the username, the age of the person, the number of times that the person has taken part in the cruises, the assessment title, and the cabin selection. "Cabins, Dining, Entertainment, Public Rooms, Fitness Recreation, Family, Shore Excursion, Enrichment, Service, and Value for Money" are also included in the evaluation areas. Passengers may also add photos to their reviews.

The study scraped the reviews of passengers who went on a cruise on European Routes between September 2020 and September 2021 from Cruisecritic.com. The data was collected from the website via the website scraping script created by the authors in the Python programing language. A total of 418 reviews written in English, which contain 208,849 words, were collected from the website and stored in as Comma Delimited data file (CSV). The data file included the ship name and review content. Other star-based-evaluations were not taken into consideration. Convenience sampling was used in this study. To ensure that the number of reviews needed to employ Leximancer software was met, as well as to match the sample size of prior relevant studies. For example, one study explored travelers' multisensory place experiences on Mediterranean port of call destinations (n=248) [56-58], another examined cruise travelers' service perceptions (n=2000) [9], and another investigated visitors' experiences in a natural world heritage site (n=351) [59].

Text mining models are significantly reliant on the preprocessing of unstructured textual data. According to [57], typical preprocessing steps include tokenizing,

stemming, bi-gram or tri-gram searches, and removal of stop words, punctuation, and irrelevant words or characters. This process can be complex and varies widely, often depending on the researcher's expertise. Leximancer, however, simplifies this process by offering a more streamlined and user-friendly approach to text preprocessing and model application, with limited scope for user customization of settings. Figure 1 illustrates the process of building a model using Leximancer Software. UGC from passengers, collated as text files, is uploaded into the software. The text processing settings are maintained by default.

However, the Leximancer application automates the content analysis, eliminates the effect of the researcher's subjective judgments on the output, and shortens the analysis time. It can also include erroneous concepts that are frequently mentioned in the text [56]. Therefore, the authors limited the total number of concepts to 60 via concept seed settings and eliminated erroneous concepts after careful reading. Erroneous concepts such as time expressions such as day, days, night, time, and times and frequently used words that reduce the depth of analysis such as cruise, cruises, and company names were eliminated via concept coding settings. Following the identification of initial concept seeds by the software, we refine the output by removing concepts (tokens) lacking significant meaning, erasing negotiation terms, and incorporating a sentiment lens.

The final output is a concept map that visually represents the service dimensions as experienced by cruise passengers. Additionally, the data exports from Leximancer provided us with valuable metrics on token co-occurrence and sentiment analysis. This enabled a more nuanced understanding of the underlying patterns and sentiments present in the cruise passengers' feedback.

5. Findings

Before the dataset was analyzed, descriptive statistics were obtained. Table 1 shows the age of the passengers, how many times they have cruised before, which route they commented on, the number of comments according to the cruise lines, and their percentage values in the dataset.

The dataset includes passenger comments from a total of 80 ships sailing on European routes with different itineraries. More than 74% of the passengers who write reviews are over the age of fifty. In normal times, it is expected that the average age of cruise passengers is high. However, the COVID-19 is more lethal in the elderly. Despite this, it is seen that middle-aged and older passenger boarded cruise ships during the pandemic period. Additionally, first-time cruisers account for less than 16% of the entire dataset, with approximately 48% of reviews coming from the Europe-British Isles & Western route.

After gaining key insights about the dataset, passenger reviews were analyzed using Leximancer Software. Once 418 comments were analyzed, Leximancer revealed 53 concepts that are clustered into 10 themes, which are presented in Figure 1. While smaller gray dots indicate the concepts, larger colorful circles indicate themes. In addition, the prominence of the themes is shown by heat mapping. According to the color wheel, the "hottest" or most significant theme appears in red, followed by orange for the next-hottest theme. For the sake of readability, the heat map indicators are given in Figure 1. The size of a concept's dot on the concept map also indicates a concept's connectivity. In other words, the larger the concept dot, the more often the concept is coded in the text with the other concepts on the map. In this context, connectivity refers to the total number of times a concept appears in print alongside every other concept on the map [55].
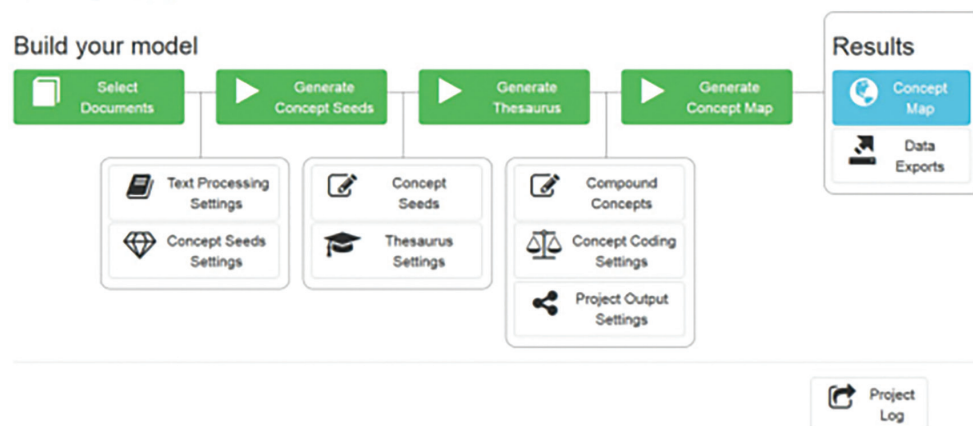

Figure 1. *Process of building the model*

As previously mentioned, 10 attributes were identified in the content analysis of passengers' online reviews of their perceived cruise quality. These attributes, ranked by their connectivity rates, are: Ship (100%), Staff (41%), COVID (37%), Cabin Location (31%), Public Area (27%), Restaurant (24%), Cabin (12%), Excursions (11%), and Ports (5%). In addition, Figure 2 represents the concept clusters within attributes.

The attributes and the words that make them up in Figure 3 are presented together with the relevancy percentages.

The 10 attributes that emerged at the end of the analysis support the literature. However, COVID emerged as a new attribute in the perceived service quality of passengers. The concepts that make up the COVID attribute are "experience, test, port, embarkation, tests, restrictions, mask, pandemic and itinerary". At the same time, it is seen that the port and excursions attributes are connected to other themes through the COVID attribute.

Accordingly, the use of the defining concepts of the COVID attribute with favorable and unfavorable structures has
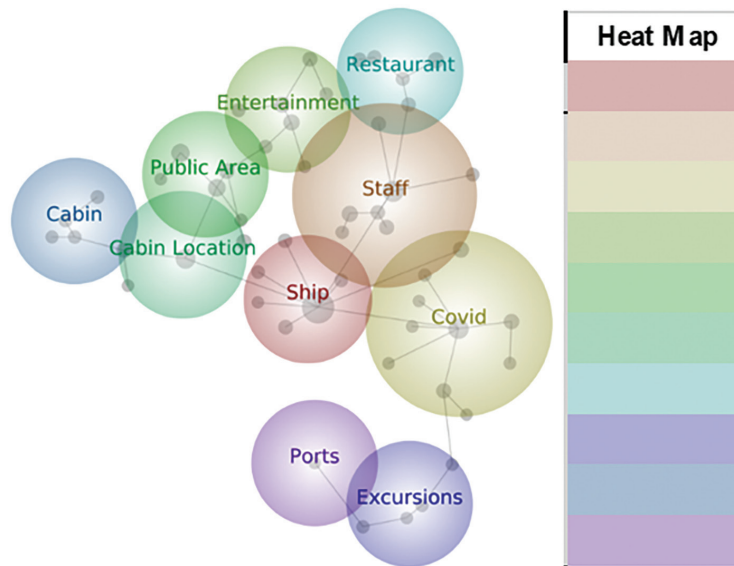

Figure 2. Theme map

Table 1. Descriptives of dataset

Age of the reviewers	Count	Percentage	Times sailed	Count	Percentage
10's	2	0.48%	First Timer	66	15.79%
20's	11	2.63%	2-5	75	17.94%
30's	35	8.37%	6-10	67	16.03%
40's	54	12.92%	10+	210	50.24%
50's	110	26.32%			
60's	122	29.19%			
70's	77	18.42%			
80's	7	1.67%			
Route	**Count**	**Percentage**	**Lines**	**Count**	**Percentage**
Europe, British Isles, and Western	199	47.61%	Virgin	158	37.80%
Europe-All	79	18.90%	Other	121	28.95%
Baltic Sea	65	15.55%	MSC	56	13.40%
Europe: River Cruise	40	9.57%	Celebrity	33	7.89%
Europe and Eastern Mediterranean	20	4.78%	VIKING	26	6.22%
Mediterranean	10	2.39%	AMA	13	3.11%
Europe-Western Mediterranean	5	1.20%	Royal Caribbean	11	2.63%

been examined, and the results are presented in Table 2. Considering all the comments of the passengers, 1887 positive structures were found, while 550 negative structures were used. However, all words describing the COVID attribute are associated with more positive structures than negative structures.

6. Discussions

In this study, the narratives of 418 people who went on a cruise on the European route during the COVID process were collected via a script written by the authors in Python. The collected texts were analyzed using Leximancer software. Leximancer software revealed the main attributes that affect passengers' perceived service quality. As a result, ten attributes that mostly

Theme/ Concepts	Relevancy (%)	Theme/ Concepts	Relevancy (%)	Theme/ Concepts	Relevancy (%)
Ship	*100*	*Staff*	*41*	*Covid*	*37*
Ships	15	Crew	21	Experience	25
Areas	10	App	16	Test	17
Capacity	7	Friendly	11	Port	16
Clean	6	Queue	10	Embarkation	6
Decks	3	Helpful	9	Tests	4
		Distancing	6	Restrictions	4
				Mask	4
				Pandemic	4
				Itinerary	4
Theme/ Concepts	**Relevancy (%)**	**Theme/ Concepts**	**Relevancy (%)**	**Theme/ Concepts**	**Relevancy (%)**
Entertainment	*22*	*Public Area*	*27*	*Cabin Location*	*31*
Bar	19	Deck	21	Area	15
Shows	14	Pool	15	Facilities	5
Bars	10	Activities	6		
Lounge	7	Gym	4		
Theatre	7				
Rooms	5				
Theme/ Concepts	**Relevancy (%)**	**Theme/ Concepts**	**Relevancy (%)**	**Theme/ Concepts**	**Relevancy (%)**
Restaurant	*24*	*Excursions*	*11*	*Cabin*	*12*
Dinner	13	Excursion	9	Balcony	8
Buffet	11	Tour	7	Shower	7
Breakfast	11	Tours	5	Bathroom	6
Lunch	9			Storage	4
Theme	**Relevancy (%)**				
Ports	*5*				

Figure 3. *Concepts under attributes*

affect passengers' perceived service quality has been revealed as; ship, staff, COVID, cabin location, public area, entertainment, restaurant, cabin, excursions, and ports. Since this study aims to determine the factors affecting the perceived service quality of cruise passengers and determine the new factors that occurred during the pandemic, the results obtained from this analysis were compared with the results obtained by [9], who examined the main attributes affecting the service quality perceived by cruise passengers in the pre-COVID period using the same method. Comparisons related to the pre-COVID and COVID periods of the main perceived service quality attributes are given in Table 3.

As can be seen in Table 3, COVID, cabin location, and restaurant themes have been added to the factors affecting the perceived service quality of customers during the pandemic period. Although food, embarkation, and disembarkation themes were important themes in the pre-COVID period, they were not positioned as the main themes during the COVID period. While food became a restaurant theme, embarkation was coded as a concept under the COVID theme, and disembarkation completely disappeared. While [9] indicated that embarkation and disembarkation are factors that affect passengers' perceptions of service quality, [60] stressed the importance of embarkation for passenger satisfaction. However, embarkation was identified in our analysis as a concept falling under the COVID attribute. This is due to changes made to the boarding procedures during the pandemic. It has been noted that before boarding the ship, guests view all pre-testing and the supply of required documents (vaccination card, passport, special permissions) as a component of the service quality. The reviews of the passengers specifically indicated the time, queue, and compliance pandemic constraints. Some customer reviews on this subject are shown below:

"We were expecting the embarkation to take some time due to several documents that had to be handed in during check-in, lateral flow COVID tests to be carried out on every passenger

Table 2. *Related concepts*

Concept	Related concept	Count	Related concept	Count
All reviews	Favourable	1887	Unfavourable	550
Experience	Favourable	117	Unfavourable	33
Port	Favourable	44	Unfavourable	15
Test	Favourable	39	Unfavourable	14
Embarkation	Favourable	18	Unfavourable	5
Restrictions	Favourable	15	Unfavourable	6
Itinerary	Favourable	13	Unfavourable	4
Mask	Favourable	8	Unfavourable	5

Table 3. Comparison of pre-COVID and COVID periods' main perceived services quality attributes

Pre-COVID Period		COVID Period	
Theme	**Concept**	**Theme**	**Concept**
Ship	Ship, family, reservation, expensive	Ship	Ship, area, capacity, clean, decks
Staff	Staff, friendly, helpful, nice	Staff	Crew, app, friendly, queue, helpful, distancing
	Food, breakfast, restaurants, delicious, elevators	**COVID**	Experience, test, port, embarkation, restriction, mask, pandemic, itinerary
Area (public spaces)	Area, pool, deck, and bar	**Cabin Location**	Area, facilities
Room/Cabin	Room, bathroom, bed	Public Area	Deck, pool, activities, and gym
Entertainment	Entertainment, crowded, spa	Entertainment	Bar, shows, lounge, theater, and rooms
	Embarkation, line, comfortable	**Restaurant**	Dinner, buffet, breakfast, and lunch
Excursions	Excursions, cancellation, itinerary	Room/Cabin	Balcony, shower, bathroom, and storage
	Disembarkation, smooth	Excursions	Excursions, tours
Port	Port	Ports	Port
Comparison with Araslı et al. [9]			
COVID: Coronavirus disease			

boarding the cruise, and waiting for the results to come back as negative before being allowed to board. However, the entire process was handled very well by [Line] and cruise terminal staff."

"The embarkation process involved a 4 1/2 hr queue, which was not COVID safe as we were all in close contact for the 4 1/2 hrs, with other passengers before we were tested."

As it can be seen in Table 3, COVID became the third most important attribute, which includes the concepts of test, COVID, pandemic, restrictions, mask, embarkation, experience, and itinerary. According to customer reviews, passengers from pre-cruise to post-cruise must undergo rapid antigen tests. Although it differs from tour to tour, the test may be applied 3 days before embarkation, just before embarkation, before and/or after disembarkation, before or after excursions/tours, or even as a daily routine. For this reason, it has been observed that the test applications and informing the passenger in all stages of processes affect the service quality perception of the passengers. Some customer reviews of these situations are shown below:

"But the policy differed when we boarded. While the website stated that IF we did not have a test within 48 h of boarding, we would be required to have a test at boarding. "We went out of our way to get a test within the proscribed time."

"Even the paperwork they showed at boarding said the same thing. Perhaps [Line] should be clearer and simply state that a test will be required at the boarding time."

"Pre-boarding required a COVID test, my wife got her result in 20 min but after 2 hours and 4 complaints they admitted they had lost mine and I had to repeat it so we boarded 2 1/2 hours late."

"If we must be COVID tested before boarding we should be told when to come be tested."

"There were only about 49 passengers, all of whom were tested and vaccinated. Regarding COVID, they tested (saliva) every day and left small collection tubes each day, which you were to drop off at the main desk every morning."

"Anyway, we were told that COVID testing occurs at dock 10 for all cruise ships. We were given a rather lengthy set of directions and proceeded to get lost."

"The COVID testing was terrible, just mayhem."

"COVID testing was offered to all guests before departure from the ship. Results were immediate."

"The porters seemed strangely disinclined to take our bags, and there was no information about where to go to get the COVID test. Eventually, we saw a long line snaking round the side of the terminal building and having asked a couple of passengers to join it."

There are many studies that indicate that the attributes of entertainment, food and beverages, spa and fitness, pool, childcare area, and casino affect the quality of service on the cruise [9,32,33,35-37,43,61-64]. To reduce the possibility of transmission during the pandemic process, many onboard activities have been restricted. Although the ships sailed at half capacity, in common areas such as spa, pool, Turkish bath, gym, sunbathing area, observation area, cinema, theater, and casino, distance restrictions and masks were imposed, and some services were completely closed to use. In addition, self-service service has been abolished in restaurants and buffets, and table service has been made mandatory. As can be seen in Table 3, although the entertainment theme was included in both periods, the theme associated with the concept of crowds in the pre-COVID period was associated with concepts such as bars, rooms, and

theaters during the COVID period. However, when the passenger comments were examined, it was seen that the restrictions were within the expectations, obligations made passengers feel safe, and even non-compliance with the COVID restrictions created a negative effect on perceived service. Some customer reviews on this subject are shown below:

"Because of COVID, market place was no self service, but that is no problem."

"We know some of the COVID restrictions may seem tiresome, but we are happy to abide by them as it means we are finally able to cruise."

"What stuck out to us was the friendly helpful staff and the COVID restrictions in place, so we all had to wear masks still in inside areas so we all kept safe."

"Thermal pool area is limited to 6 people in 45 min sessions Well organized and very relaxing with super friendly staff."

"COVID restrictions only allowing 10 people a time in the indoor pool the attendant made in fair for everyone to have chance of swimming and using the jacuzzi."

"Entertainment was varied and excellent but due to COVID new regulations the venues had to keep moving around the ship so areas could be sanitized which again I thought was great for the passenger safety."

"Considering all the concessions that the cruise industry had to meet in order to comply with the ever changing cruise restrictions, we thought RCL did an outstanding job!! We felt safe at all times, and on those occasions when we forgot to place our mask over our noses, we were gently reminded."

"Entertainment was positively different, but a few things were curtailed due to weather and COVID.".

"the health and safety procedures to protect us from COVID- the evidence speaks for itself as all three of us caught COVID. We had to stand in long queues in confined spaces, mask wearing was not enforced, and rules such as restricted numbers in lifts or hot tubs were not adhered to or enforced."

While, [65] claimed that cruise itinerary affects service quality, [66] suggested that cruise arrangements such as itinerary, accommodations etc. effects the perceived value of the cruise experience. The cancelation of port of calls, restrictions on solo shore trips, except paid tours and excursions by lines, were noted in passenger reviews. In addition, restrictions applied in paid tours, such as prohibition of exiting tour vehicles, shopping restrictions, social distancing, and mask obligations, have also appeared in narratives. Some customer reviews of these situations are shown below:

"...Not fussed about a cruise to nowhere, just wanted to experience it again albeit expecting a few changes and restrictions due to COVID."

"This cruise only made a stop in Belfast and, as a COVID measure, you were only allowed off the ship through an organized tour via RCL."

"Fortunately, I already had flags from all three of the countries on this itinerary, because independent exploration in the ports was severely limited because of COVID-19 precautions. We enjoy both cruises and land tours; often, our trips combine the two."

"Excursions (obligatory otherwise you're not allowed off- COVID regulations) were really good."

"I can only think that ports and facilities were restricted by the COVID regulations. For me, this resulted in too many days at sea and not enough port excursions."

"Excursions were very limited (due to COVID) and pricey."

"Excursions during COVID are limited and seem to mainly involve sitting on a bus or walking in a group; forbidden to stop and rest, to shop, or even buy an ice cream or coffee on pain of not being allowed to re-board the ship."

"We stayed on the ship because again because of COVID the only excursions were with the ship, I am not complaining about this, we knew this before we boarded and we accepted it."

According to the results of the research, the most frequently used concept to define the COVID factor is "experience". Despite the interruptions, bans, and changes in services during the COVID period, passengers mostly talked about their experiences positively as they felt safe.

"We can honestly say that this cruise exceeded our expectations. I be worried that the COVID restrictions would impact the experience, but on the contrary, they made you feel safe and they were handled brilliantly."

"Many people considering a cruise will ask if COVID precautions will somewhat diminish the experience. "I think the general opinion was not really."

"Wonderful experience from start to finish. The care over our safety at a time when the delta COVID variant was in ascendancy nationally was magnificent and most welcome."

In addition, as shown in Table 3, the ship theme, which included concepts related to family and pricing in the pre-COVID period, started to include concepts such as area, capacity, and cleaning situation of environment during the COVID period. While the staff theme continued to include concepts that create staff-based customer satisfaction, such as helpful and friendly, in both periods, the distance concept was added to the theme in the post-COVID period. The Room/Cabin theme did not differ much, similar to the staff theme, but during the COVID period, the balconies and storage facilities of the cabins were added to the attributes

affecting the perceived service quality as new concepts. Additionally, during the COVID period, the cabin location theme emerged as a new perceived service quality attribute. The themes of area, excursions, and port were associated with similar concepts in both periods, and no significant differences were detected.

7. Conclusion

Forecasting consumer demands and expectations has been an important issue for the manufacturing and service industries at the beginning of the industrial revolution. Especially due to the intangible nature of the service sector, understanding and meeting customer demands and expectations in this field and measuring perceived quality have always been important challenges for the marketing sector. The entire planet is constantly changing. Although companies have plans to estimate and mitigate numerous risks, unexpected, unanticipated, and disastrous occurrences can still occur. Similar to the COVID-19 pandemic, which has developed into an unpredictable occurrence with disastrous consequences, particularly for the cruise industry. Even if the epidemic has impacted the business, today's lessons can help prevent and manage a similar occurrence in the future. Hence, the main motivation of this study was to determine whether the factors affecting customers' perceived service quality changed during the pandemic period in the cruise industry. Therefore, this study aims to determine the factors affecting the perceived service quality of cruise passengers and determine the new factors that occurred during the pandemic.

Because of the study, ten attributes that mostly affect passengers' perceived service quality has been revealed as; ship, staff, COVID, cabin location, public area, entertainment, restaurant, cabin, excursions, and ports. COVID, restaurant, and cabin location revealed three new attributes in this regard. In addition, favorable and unfavorable structures of the COVID attribute have also been examined. Considering all the comments of the passengers, 1887 positive structures were found, while 550 negative structures were used. However, all words describing the COVID attribute are associated with more positive structures than negative structures. This result was interpreted as the fact that the cruise companies' compliance with COVID measures during this period had a positive impact on customer satisfaction.

Another result obtained within the scope of the study that can be described as remarkable is related to demographic findings. According to the findings obtained within the scope of the study, 74% of those who made user comments regarding their cruise travel during the pandemic period were passengers over the age of fifty. However, according to studies in the literature, it is argued that the average age of cruise passengers is around 50 years [67]. In normal times, it is expected that the average age of cruise passengers is high. However, the COVID-19 virus is more lethal in the elderly. Despite this, it is seen that middle-aged and older passenger boarded cruise ships during the pandemic period. This finding was interpreted by the authors in two ways. The first is that people over the age of 50 preferred cruise travel more during the pandemic period, and the second is that people over the age of 50 created more online user comments during the pandemic period. To make a definitive judgment regarding the findings, it is considered that it would be useful to examine the tendencies of individuals over the age of 50 to prefer cruise travel and create online user comments.

This study is important because it analyzes UGC, which although relatively new, is considered a reliable data source for various reasons in different sources. These contents, created almost constantly by people all over the world, create big data sets that are very difficult to analyze and draw meaningful conclusions. However, making this big data meaningful with the help of methods/methodologies based on artificial intelligence and machine learning, such as those used in this study, will greatly benefit both the application and the literature. To the best of our knowledge, this is the second known study to measure cruise passengers' perceived service through artificial intelligence technologies [9]. This study is important because it supports the findings obtained by [9] and it also argues that consumer preferences will be affected in extraordinary situations such as pandemics. Therefore, it is thought that repeating the same method using similar samples in the post-pandemic period and comparing it with the existing results will contribute greatly to the marketing and cruise literature.

Authorship Contributions

Concept design: B. Çullu, N. Özispa, and G. Arabelen, Data Collection or Processing: B. Çullu, Analysis or Interpretation: B. Çullu, Literature Review: N. Özispa, Writing, Reviewing and Editing: B. Çullu, N. Özispa, and G. Arabelen.

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